

METHOD AND SYSTEM FOR TRANSMITTING MESSAGES ON TELECOMMUNICATIONS
NETWORK AND RELATED SENDER TERMINAL

CROSS REFERENCE TO RELATED APPLICATIONS

This application is the US national phase of PCT
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March 2004 as WO 2004/019583, and claiming the priority of
Italian patent application TO2002A000724 itself filed 14 August
2002, whose entire disclosures are herewith incorporated by
reference.

TECHNICAL FIELD OF THE INVENTION

The present invention relates to the transmission of
messages on telecommunication networks.

BACKGROUND [[ART]] OF THE INVENTION

The introduction of new generation mobile terminals,
for instance according to the UMTS standard (Universal Mobile
Telecommunications System) or the GSM/GPRS standard (acronyms for
Global System for Mobile communications and General Packet Radio
Service) has enabled the transmission and presentation on
terminal of messages with multimedia content comprising different
elements, such as text, sounds and images, also in motion.
[[said]] the messages are currently indicated as MMS, acronym for
Multimedia Messaging System.

The capability of transmitting [[said]] the messages
gives rise to different kinds of problems.

In the first place, it is necessary to ensure that
[[said]] the messages can be constructed with relative ease by
using an apparatus, like a mobile telephone, which, due to the

reduced size and processing capacity, is not ideally suited for generating messages with complex content.

In the second place, it is desirable for terminals with the ability to transmit and receive MMS messages to be able to coexist and interact with old generation terminals such as mobile terminals operating according to the GSM standard, able to generate only text messages of the type currently called SMS, acronym for Short Message Service. It is reasonable to think that the two technologies are destined to coexist for a fairly long time before all currently circulating terminals are replaced.

OBJECT DISCLOSURE OF THE INVENTION

The ~~[[aim]]~~ object of the present invention is to favor the coexistence and the interaction between terminals with the ability of transmitting text messages like SMS message and terminals able to receive MMS messages.

SUMMARY OF THE INVENTION

According to the present invention, ~~said aim~~ this object is achieved thanks to a method with the characteristics specifically set out ~~in the claims that follow~~ below. The invention also includes the related system as well as the corresponding sender terminal.

In essence, the solution according to the invention allows old generation terminals - able to send SMS text messages - to induce the generation of messages with multimedia content, destined to MMS terminals.

In the currently preferred embodiment, the solution according to the invention allows to provide a service that automatically transforms a pure text message into a multimedia

message, hence into a "richer" message than the starting message, constituted by the pure text.

In the currently preferred embodiment, the solution according to the invention provides for using the system for the automatic automation of three-dimensional characters based on text or natural audio produced by the same Applicant and identified by the registered trademark JoeXpress®.

In this regard it is useful to consult the documents EP-A-0 991 023 (US 6,532,011), EP-A-0 993 197 (6,665,643) and WO-A-01/75805 (7,123,262). The system in question is able to transform a text or a recorded voice into the movements of a character who enunciates the processed sentences. [[said]] These movements also include movements that are not linked with the spoken word, with facial expressions and body motions. The system is also able to handle other elements such as the personalization of the character's appearance (for example, the color of the hair, of the eyes, the way it is dressed, etc.), the place where the character is positioned, the movement of the viewing point, the background music. All concurs in the construction of a video clip from a restricted number of input parameters provided.

In this way, the solution according to the invention allows, for instance, to generate animations destined to MMS terminals on the basis of the text contained in a starting SMS message. In this case, the result is an MMS message comprising different parts, such as the scene description part (in "Synchronized Multimedia Integration Language" or SMIL) and the parts containing the multimedia objects to be inserted in the message, among which are automatically generated animations.

The first generation of MMS terminals is subject to fairly stringent constraints on message content: in particular, video is not supported and the maximum size of the messages is 30 kBytes. A preferred embodiment of the solution according to the invention therefore allows to incorporate in the generated MMS message an animation with small size. In particular, the video is transformed into an image according to the GIF standard (acronym for Graphics Interchange Format) subjected to animation using a rather low animation sampling rate, i.e. around one Hz.

Moreover, the original text is subdivided among the various frames of the sequence. By doing so, with animations having, for example, sizes in the order of 100x80 pixels (the dimensions of the display units of currently marketed MMS terminals) one can generate messages containing animations lasting about 15 second, with complex models and scenarios, or longer in the case of simpler models, which allow a higher compression ratio within the animated GIF image.

If the total size of the message is limited (for instance, to 30 kBytes) making it problematic to transmit both video and audio, it is possible to cause the terminal, during the viewing of the animated GIF image, to reproduce, instead of a voice message, a melody inserted in the message: this type of sound ("ringer") is able to be contained in a very small number of bytes.

In the presence of less strict constraints on the size of the message, the solution according to the invention allows to transmit, instead of text inside the frames or even in parallel therewith, the audio associated with the animation, generated for instance by a voice synthesizer.

In this scenario, it is possible automatically to generate an MMS message even from natural audio, in which case the animation is guided by the result of the process carried out by a phonetic recognizer. Voice synthesizers and phonetic
5 recognizers able to carry out the functions described above are currently available in the art.

In addition to animation, the MMS message can advantageously contemplate a part destined to contain more text, melodies and images, useful for inserting, for instance,
10 so-called "logos" and/or advertising slogans.

BRIEF DESCRIPTION OF DRAWINGS

The invention shall now be described purely by way of non limiting example with reference to the accompanying drawings, in which: [[-]]

15 Figure FIG. 1 shows, at functional architecture levels, the structure of a system able to operate according to the invention, [[-]]

Figure FIG. 2 is a flow chart illustrating the steps for transmitting a message according to the invention, and -

20 ~~Figure 3, comprising two parts indicated respectively as~~

FIGS. 3A and 3B ~~, reproduces show~~ two contiguous parts of a functional block diagram illustrating a possible form of arrangement of the system according to the invention.

BEST MODE FOR CARRYING OUT THE INVENTION

25 The description provided herein refers to the application scenario which, at least at present is the most attractive one for the possible use of the invention, i.e. the conversion of text messages generated as SMS messages in a GSM

mobile terminal into MMS messages destined to be transmitted on a network operating according to the UMTS standard.

In any case, the solution according to the invention is also applicable to text messages generated differently, for instance in the form of email messages, and it can be used to transmit MMS messages on any type of network such as to support such a transmission, hence without limitation to UMTS networks.

In the diagram of Figure FIG. 1, the numeric reference 10 globally indicates a module having the function of MMS relay/server and comprising for this purpose a sub-module with relay function, indicated as 101, and a sub-module with server function, indicated as 102, mutually connected through an interface indicated as 103. Naturally, the sub-modules 102 and 103 can also be mutually integrated.

The numeric reference 11 instead indicates a database of the users of an MMS service. This is substantially a database where, for each user to whom the MMS service is made available, the telephone number (or an equivalent indication) and the information about the terminal type employed by the user in question are recorded.

The database 11 is connected to the module 10 through an interface 111.

The numeric references 12 and 13 indicate two users connected in a network to the module 10 (this can typically take place through an UMTS network) so as to be able to receive MMS messages.

The user indicated as 12 is a user directly included in the network whereto the module 10 is attached. The related connection therefore is of the direct type, through an interface indicated as 121.

The user indicated as 13, instead, is a user nominally attached to another mobile network.

In this case, the connection to the module 10 is not direct but is achieved through an additional module 10' substantially similar to the module 10, by means of corresponding interfaces indicated as 131a and 131b.

The distinct representation of the user 12 and of the user 13 is destined to highlight the possibility of applying the solution according to the invention also in a context in which multiple telecommunication networks mutually co-operate in a general internetworking or roaming scenario.

The reference 14 indicates a server, such as an electronic mail server, connected to the module 10 through a respective interface 141 in order to be able to operate as a recipient of MMS messages.

Lastly, the reference 15 indicates the system for billing the rendering of the MMS message services, connected to the module 10 through a respective interface 151.

The system architecture and the various constitutive elements described heretofore correspond to solutions to be considered wholly known in the art. These solutions are already able to be used for sending MMS messages within telecommunications networks (such new generation mobile networks operating according to the UMTS standard). This fact makes it superfluous to provide herein a more detailed description of the architecture and of the elements in question.

An important characteristic of the solution according to the invention is given by the fact that to the module 10 it is associated, preferably through a respective interface 161, a module or sub-system 16 able to convert text-only messages, such

as SMS messages coming from an SMS message management center 17 (usually called with the acronym SMSC) into messages with multimedia content. After possible further processing in module 10, [[said]] the messages can be broadcast by the module 10 in the form of MMS messages destined to users such as the users 12,13 and 14 indicated in **Figure FIG. 1**.

In particular, the module 10 can be configured in such a way as to allow the transmission of a determined message MMS to multiple recipients or to a list of recipients.

Consequently, though hereinafter reference shall be made nearly exclusively to the generation, from an SMS message, of an MMS message sent to a single recipient, the solution according to the invention is easily suited to allow the MMS message in question to be broadcast to a list of recipients defined for instance by means of an http request or by means of an ftp request sent to the module 10.

As stated previously, the core of the module 16 is constituted by the system for the creation of multimedia content represented by virtual characters animated by text or natural voice. An example of such a system is the JoeXpress® system, mentioned above.

Such a system enables a user to select a virtual character, its background, any personalizations, the format in which the content is to be produced. The selected parameters are used to produce animations with the desired context and format.

The flowchart of **Figure FIG. 2** shows the steps of the process whereby a system according to the invention is accessed by a user, indicated as 18 in **Figure FIG. 1**, who acts as a "sender." The user 18 has a terminal able to send SMS messages

to a corresponding center able to handle this type of messages, such as the center indicated as 17 in Figure FIG. 1.

Starting from an initial step, indicated as 200, the reference 202 indicates the step in which the user 18 composes on his/her terminal an SMS message (with the characteristics better illustrated hereafter) sending it to a telephone number associated with the service which forwards [[said]] the SMS message after providing it with MMS characteristics.

The service in question is implemented mainly by the module indicated as 16, but some ~~functionalities~~ functions can be performed by the module 10 and, possibly, by the module 17.

In the step indicated as 204 in Figure FIG. 2, the service management function-hence essentially the module 16-generates the request for the emission of an MMS message corresponding to the received SMS message. As will be explained better hereafter, such a request contains, in addition to the message itself, also the user's identifier and (possibly) information pertaining to the type of recipient terminal.

In the step indicated as 206, the module 16 processes the request received, generating an MMS message adapted to the graphic and processing capacity characteristics of the recipient terminal. In the step indicated as 208, [[said]] the MMS message is sent to a corresponding MMS center (such as the module 10) which, in a subsequent step 208, forwards the message to the recipient terminal, such as the terminal 12,13 or 14.

The step 210 indicates the step in which [[said]] the message is presented to the recipient terminal according to the typical modes of presentation of an MMS. Once the transmission is completed with the reading of the MMS message, the system moves to a conclusive step, indicated as 212.

The telephone number associated with the service, destined to be dialed by the user 18 in the step 202 is preferably a dedicated telephone number of the kind usually called "large account."

5 The sequence of characters sent by the user contains, in addition to the text of the message, also some information in the header such as the telephone number of the recipient of the MMS message (users 12,13, 14 of the diagram of Figure FIG. 1), the virtual character that will reproduce the message and the
10 background into which it will be inserted.

The last two information items are optional and can therefore be omitted. In case of omission, corresponding information are selected automatically by the module 16, for instance as a random choice or as a predefined choice (default).
15 Naturally, this can be applied even for only part of [[said]] the information: for instance, if only the character is specified, the module 16 automatically selects the background.

The sequence of characters sent to the service therefore usually has the following form:

20 <recipient telephone number> [<virtual character
 [<background>]]
 <text message>

In the step 202 the header of the message can be composed either manually or by means of a script residing on the
25 terminal 18 which allows to select the virtual character and the background by means of a menu and the recipient from the address book.

If the message is dialed manually, the sequence of characters can contain errors. For example, the user could
30 specify the name of a non-existing virtual character or

background. In this case, the service replaces the faulty information by automatically selecting correct options.

It will be appreciated that the script functions correspond essentially to functions provided in some mobile telephony terminals for sending SMS messages, with the possibility to load the related software remotely in the individual terminal 18 (in particular in the Subscriber Identity Module or SIM of the terminal) by the same service management system.

The module for transforming the SMS text format into MMS multimedia format, preferably based on the JoeXpress® systems already mentioned several times above, is preferably used in the mode called "text animation."

In this case, the text of the SMS message is processed by a voice synthesizer which transforms the text into voice and provides the timed phonetic sequence, which is then used for the automatic generation of the speech movements of the selected virtual character. The text provided as an input to the SMS/MMS conversion module may contain meta-information that have an influence over the resulting animation, adding expressions and gestures to the virtual characters and altering the synthetic voice.

The meta-information is inserted in the text as sequences of characters that can have, for instance, the following form:

<tag><action_type>[<par1>] [<par2>]... [<parn>]

where:

<tag> is necessary to distinguish the meta-information from the text to be synthesized

<action-type> specifies which action is to be executed. Examples of actions are: change in voice timbre, reproduction of a facial expression or of a body movement, change in viewpoint, etc.

5 <parl-n> is the parameter that modifies the action, for instance the alteration of the duration of a facial expression.

An alternative representation at higher level is constituted by the so-called "emoticons," i.e. by sequences of characters commonly used in Internet in text communications, which represent emotional states. Examples of emoticons are : "
10 ;-)", " :-)", " :-0", etc.

Emoticons are transformed by the system into a semantically equivalent form using the representation described above. Support [[to]] for the emoticons is motivated by the fact
15 that they are familiar to users and simple to insert in the text, while having the same flexibility as low_level representation.

A system like the JoeXpress® system produces animations of three-dimensional models that can be translated by the system into different formats, classifiable in two categories depending
20 on whether the three-dimensional information is retained or not.

To the first category belong, for instance, the sequences of MPEG-4 Face and Body Animation parameters, VRML animations (acronym for Virtual Reality Modeling Language), 3D Studio Max animations etc.

25 To the second category belong the video coding formats like MPEG-1, MPEG-2, MPEG-4 video, animated GIF (while it is not a video coding format in the strict sense of the term, the GIF-89a format does allow to create image sequences).

30 The audio of the animation can be encoded together with the video or separately as in the case of VRML or animated GIF.

Due to the limits in the terminals of the transmission network, multimedia contents are subject to constraints such as the maximum size of the message, spatial resolution, time resolution, and the type of coding of the animation.

5 For this reason, in addition to the text of the message and to the identifier of the sender, it is necessary to take into account the type of terminal whereto the multimedia message is to be transferred.

10 The terminal type essentially identifies the class of the terminal (in essence, characteristics such as storage

 capacity, display size, etc.) and any other constraints due to the transmission network.

15 The MMS message destined to be produced in a system according to the invention is therefore conditioned to exploit the available resources most efficiently, within the imposed constraints.

This requirement can be met in at least two different ways.

20 A first way provides for the request to create the MMS message, generated at step 204, to contain, in addition to the text of the message and the sender's identifier, also information indicating the class whereto the message to be generated must belong, i.e. the type of terminal whereto the MMS message is destined and hence its performance characteristics. The video
25 content destined to integrate the SMS textual message is then generated according to the recipient terminal type, i.e. in such a way as to cause the MMS message (derived from the multimedia message obtained by integrating [[said]] the video content and the SMS message) to be directly compatible with the

characteristics of the MMS terminal destined to receive the multimedia message.

When this solution is adopted, the module 16 is able to search, based on the recipient's identifier, the terminal type information stored in the database 11. The connection between the module 16 and the database 11 can be either of the direct or of the indirect type, through the module 10, according to the criteria whereto Figure FIG. 1 refers.

A second way to obtain the same result provides for the multimedia video content (destined to be added to the SMS message) to be generated by the module 16 on the basis of criteria that are standard, hence independent from the type of terminal whereto the message is destined to be transmitted.

The multimedia message deriving from the integration between the SMS textual message and [[said]] the standard multimedia video content is forwarded by the module 16 to the module 10 which, reading the information about the recipient terminal from the database 11, "specializes" the MMS message derived from the multimedia message, adapting it to the characteristics of the recipient terminal.

The choice to adopt one or the other solution is primarily dictated by application considerations.

The first solution has, at least in principle, the advantage of not entailing the generation of information destined to be discarded when the message is adapted to the requirements of the recipient terminal. However, this advantage is offset by the need to ensure that the module 16 is able to receive the information about the type of terminal, residing in the database 11.

The second solution has the advantage that it exploits the availability of the information of the database 11 at the level of the module 10, already normally provided for current MMS applications. In current MMS applications, the module 10 is
5 already capable of achieving a specialization of the forwarded MMS messages according to the characteristics of the recipient terminal. The advantages indicated above, however, are at least marginally tempered by the fact that this solution entails the generation, by the module 16, of information destined to be
10 discarded.

Whichever solution is adopted, it is possible to benefit from the fact that the same animation can be represented in an MMS message in substantially different manners.

For instance, one can make use, as stated previously,
15 of an animated GIF image with a low number of frames per second, in which case each frame shows the text of the message pronounced at that instant by the character. This particularly compact representation is well suited for situations in which the message size constraints are particularly stringent, or when the
20 recipient terminal is not able to show a video.

Alternatively, one can employ an animated GIF image, with compressed audio. In this case, the synthesized voice, possibly complete with scene audio, is also included in the message. This is a useful representation for terminals that do
25 not support video but are able to handle audio, when the size of the message is sufficiently large to contain both the moving image and the audio track.

An additional alternative is represented by a video clip complete with audio. In this case, an animation is obtained
30 that can be more fluid in its motions thanks to the higher

compression ratio offered by a video coding with respect to an animated GIF image and to the higher number of frames consequently used in the animation. This solution can be adopted with terminals that are able to support video coding.

5 It should be stressed that the ways to package the message recalled above are mere examples, and they are far from being exhaustive of the possibilities offered by the solution according to the invention.

10 The description will now be provided, with reference to **Figures FIGS.** 3A and 3B, of a possible architectural arrangement of the module indicated as 16 in Figure 1.

15 The block or module 300 is destined to receive as its input the SMS message substantially as transmitted by the terminal 18 and to perform thereon the operation of extracting the information from the header.

20 As previously seen, the first part of the text is represented by a header containing the number of the recipient terminal (for instance, with reference to the diagram of Figure 1, the terminal 12, the terminal 13 or the terminal 14) and, optionally, the indication of the character and of the background which the sender user wants to use to generate the video content. These data are divided from the actual message by a separator character.

25 The message can contain low or high-level meta-information (for instance the so-called emoticons) which influence the resulting animation.

 As an example of such text, one can consider the string:

30 "3356121180 Morpheus Country@Hi! I'm at the beach:-)
but I'm getting bored without you. \kyawn, 150."

In the example, the separator used is the character - Associated [[to]] with the message in question are the identifier of the sender as well as, possibly, the string indicating the recipient's terminal model.

5 The reference 302 indicates the database of the module 16 which, in the preferred implementation based on the JoeXpress® system, contains information such as the list of characters usable for generating the video content, the languages associated [[to]] with them, the available scenarios, etc. The database 302
10 also contains the three-dimensional models of the characters and of the backgrounds.

Co-operating with the database 302, the block 300 extracts from the message header information such as the recipient's identifier, as well as the character and the
15 background to be used to create the video content.

The block 300 then communicates with the database 302 that contains the character list, voices, available backgrounds and, if these information are omitted or erroneous in the header of the received SMS message, the block 300 automatically selects
20 correct options.

The block 300 generates at its outputs the following data/information: [[-]]

the text of the message without the header ("Hi ! I'm at the beach :-) but I'm getting bored without you. \ kyawn, 150") destined to be sent to an additional block 302 whose
25 function shall become more readily apparent hereafter; [[-]]

the name of the character P, protagonist of the animation (in the example illustrated herein, [[said]] the name is "Morpheus"), [[-]]

the language L associated with the character (for instance, English), [[-]]

the background A corresponding to the scenario in which the virtual character P is to be placed (in the example considered herein, the background is a "country" background), and [[-]]

the identifier of the recipient D (constituted, in the illustrated example, by the number 3356121180).

Starting from the text of the message M received from the block 300, the block 302 transforms the emoticons into meta-information capable of being used by the information system that simultaneously determines what text will be inserted in the frames constituting the animation of the MMS message constituting the output of the module 16.

Therefore, the output of the block 302 is constituted both by a text TBS with low-level information, i.e. a text in which emoticons are replaced with low-level meta- information ("Hi! I'm at the beach \ksmile but I'm getting bored without you. \ kyawn, 150"), and a text TE in which all low-level information has been eliminated, retaining only what will be [[said]] the by the character plus the emoticons ("Hi ! I'm at the beach :-) but I'm getting bored without you.").

The text TBS generated by the block 302 is sent to a block 304 destined to extract the list of actions contained in the text and to prepare the text in the form used by a voice synthesizer 306 in such a way as to obtain also the timing to be associated [[to]] with the aforesaid these actions.

The block 304 transmits to the synthesizer 306 a text TAG in which the low-level meta-information are replaced with "tags" of the voice synthesizer (text-to-speech). [[Said]] These

tags are sequences of characters identified by the synthesizer as special information and used either to alter the synthesized voice or to obtain from the synthesizer 306 the time instants associated [[to]] with the tags in the synthesized sentence.

5 [[said]] the time instants are used to determine the timing of the actions.

The block 304 also generates as an additional output a signal TA substantially corresponding to a list of the actions contained in the text, complete with any parameters.

10 Referring to the SMS message mentioned several times above, there are essentially two actions contained, i.e.: [[-]] smile, and [[-]] yawn, 150.

The parameter 150 modifies the duration of the "yawn" 15 action with respect to a standard duration.

The voice synthesizer 306 transforms into a voice signal the text TAG received from the block 304 using the selected language identified by the signal L generated by the block 300.

20 In addition to the voice signal, the block 306 also produces the timed phonetic sequence FT, used as the basis of the construction of the movement of the spoken word. It should be recalled that the timed phonetic sequence is the sequence of phonemes constituting the spoken sentence, integrated with the 25 time instances whereat the phonemes are spoken.

The signal indicated as V is, instead, the actual synthesized voice signal.

The blocks indicated with the references 308 and 310 are engines that supervise the animation of the spoken word and

the corresponding facial and body animation of the character used for the video content.

The block 308 receives as an input the phonetic sequence FT transforming it into a "visemic" sequence, i.e. into the movement produced by the face as it speaks.

To obtain a realistic movement, the animation engine considers the mutual influence effect of adjacent phonemes, [[said]] the co-articulation phenomenon. The movement produced is three-dimensional and the related output signal AP is constituted by animation parameters that describe the movement of the spoken word in three- dimensional fashion and independently from the character.

This means that such parameters are successively applicable to characters with any shape and complexity, human and otherwise.

The block 310, serving as facial and body animation engine operates on the basis of the list of actions corresponding to the signal TA generated by the block 304 integrated in a virtual summation node 312 with the information on the timing of the actions, generated by the synthesizer 306.

The block 310 operates in co-ordinated fashion with an additional database 314 which contains sequences of facial and body movements in the form of animation parameters independent from the character, thus similar in this regard to the parameters output by the block 308. In the example, the sequences "smile" and "yawn" are two movements drawn from the database 314.

The facial and body 310 animation block unites the individual actions corresponding to the various movements that the character will have to perform, creating a single sequence of

animation parameters. The individual movements are altered based on any parameters associated therewith.

The movements also undergo automatic variations in intensity, duration, specular characteristics, etc. to enhance variety. Lastly, some movements executed by the characters but not explicitly indicated, such as blinking eyelids, are also added.

The output of the block 310 is constituted by a signal AFC representative of animation parameters that describe the movement of the spoken word in three-dimensional fashion, independently from the character. [[said]] the parameters are, therefore, successively applicable to characters with any shape and complexity, human and otherwise, such as animals.

A successive block indicated as 316 has the task of mixing the movements of the spoken word (signal AP) with the other movements (signal AFC) to obtain a realistic result. The operation of the block 316 is based on a logic that takes into account the priorities of movements that may be contrasting, such as speaking a plosive phoneme (such as the letter "p") and yawning. The resulting movement is three-dimensional.

The output signal of the block 316 is constituted by a signal AIP representative of an animation independent from the character.

The signal AIP is fed to a block 318 that transforms the independent animation (signal AIP) into the movement of the character selected on the basis of the signal P extracted from the block 300. The resulting movement is dependent on the topology of the model. The model associated with the character is, as seen previously, contained in the database 302.

The output signal of the block 318 is constituted by a signal ADP identifying the sequence of movements of the selected character.

The signal ADP in question is fed to a block 320 that merges the signal ADP with the background information A that comes from the block 300 with additional information on the characters and on the backgrounds drawn directly from the database 302.

All this in order to add to the animation of the character also the remaining animations which may be present in the scene (signal A) and can be driven by means of the meta-information in the text, as movement of objects or change of the viewpoint of the shot.

The output signal of the block 320 is constituted by a final three-dimensional animation signal TRD destined to be sent to a block 322 tasked with the rendering operation, i.e. with the operation of representing on a screen, as a pixel matrix, the three-dimensional scene constituted by the character and by the background. The sequence of [[said]] the pixel matrix, obtained at regular time intervals, constitutes the output of [[said]] the block. The output of the rendering block 322 is constituted by a sequence of video frames of the animation indicated as FV.

The sampling rate of the video frames is a parameter that is typically set in preferred fashion to 25 Hz.

The signal FV is fed as an input to an additional block 324 destined to receive also the text with emoticons TE generated by the block 302.

The block 324 distributes the text among the various frames constituting the video animation produced. [[said]] the operation is optional and is performed when an MMS message

without audio is to be generated, i.e. an MMS message in which the SMS message is shown in the form of text and animation.

The output of the block 324 is constituted by the set of all movements of the character and of the scene. [[said]] the signal FVT, corresponding in practice to the sequence of the video frames with the text, is fed to a video coding block 326 destined to receive as its input, in addition to the signal FVT, also the signal V pertaining to the synthesized voice as well as the information TV pertaining to the type of terminal of the recipient.

The embodiment shown in Figures FIGS. 3A and 3B refers to a solution in which [[said]] the information is made available at the level of the module 16. [[said]] the information generally indicates brand and model name of the recipient terminal (for example, Sony Ericsson T68i, Nokia 7650, etc.).

The block 326 proceeds in this case by creating the video clip directly in a format suitable to be viewed from the recipient terminal in question. The adaptation of the video clip to a determined type of terminal can influence, for example, on the spatial and time resolution of the frames, on whether the audio channel is inserted or not, etc.

The solution whereto reference is made herein therefore provides for integrating the SMS message with a video content generated in this way so that the resulting multimedia message, generated by the module 16, is in a format suitable for being viewed from [[said]] the terminal.

As stated previously, the solution according to the invention can, however, also be implemented in conditions in which the module 16 (and, therefore, the block 326, in the

embodiment illustrated herein) does not carry out any "specialization" action of this kind.

In this case, the video clip, or in general the video content destined to complement the incoming SMS text message, is generated in a standard format, i.e. without taking into account the characteristics of the recipient terminal.

The related format conversion, destined to make the final MMS message actually viewable by the recipient terminal, is then left to the module 10 (Figure 1) with MMS relay/server functions.

In the embodiment example illustrated herein (which is in fact an example) the output signal from the block 326 is then constituted by a signal VC essentially similar to a video clip in compressed format.

[[Said]] [[The]] signal is transmitted to a block 328 destined to construct, starting from the multimedia message carried at its input, a message corresponding to the MMS standard.

To proceed in this way, the block 328 receives at its input, in addition to the signal VC output by the block 326, also the signal TE corresponding to the text with emoticon generated by the block 302, the signal pertaining to the recipient D coming from the block 300, as well as the information about the sender S: the latter information is derived from the center 17 of Figure 1 according to known criteria, requiring no detailed description herein.

To generate the MMS message, destined to be sent to the module 10, the block 328 inserts the video animation previously computed in an MMS message. This preferably takes place using

the SMIL language of description of the scene and joining various multimedia objects in a single form comprising multiple parts.

The block 328 also inserts in the message header the information about the sender, recipient and subject. The subject
5 is constructed automatically using the first characters constituting the text with emoticons.

Preferably, the block 328 is also destined to co-operate with an additional database 330 constituted by a collection of images to be inserted in the MMS message as
10 "logos" or advertising, or as sounds able to be used as background music for the scene or as advertising jingles.

Naturally, without changing the principle of the invention, the details of its implementation and the embodiments may be amply varied with respect to what is described and
15 illustrated herein purely by way of example, without thereby departing from the scope of the present invention. This holds true in particular, but not exclusively, for the possibility of applying the invention to convert into MMS messages text messages generated other than by an SMS, for instance in the form of
20 e-mail messages, and to the possibility of applying the invention to the transmission of MMS messages on other than UMTS networks.